

What is claimed is:

1. An over-current protection device, comprising:
 - a positive temperature coefficient material layer;
 - an upper electrode foil disposed on the upper surface of the positive
 - 5 temperature coefficient material layer;
 - a lower electrode foil disposed on the lower surface of the positive temperature coefficient material layer;
 - a first metal terminal layer electrically connected to the upper electrode foil with at least one non-full-circular conductive through hole
 - 10 and at least one full-circular conductive through hole;
 - a second metal terminal layer electrically connected to the lower electrode foil with at least one non-full-circular conductive through hole and at least one full-circular conductive through hole; and
 - at least one insulating layer for isolating the upper electrode foil from
 - 15 the second metal terminal layer and the lower electrode foil from the first metal terminal layer.
2. The over-current protection device according to Claim 1, further comprising a solder mask disposed between the first metal terminal layer and the second metal terminal layer.
- 20 3. The over-current protection device according to Claim 1, wherein the full-circular conductive through hole is disposed on the surface of the first metal terminal layer and the second metal terminal layer.
4. The over-current protection device according to Claim 2, wherein the full-circular conductive through hole is disposed on the surface of the
- 25 solder mask and electrically connects first metal terminal layer and the second metal terminal layer by a metallic wire.

5. The over-current protection device according to Claim 1, wherein the non-full-circular conductive through hole is a half-circular conductive through hole or a quarter-circular conductive through hole.

6. An over-current protection device, comprising:

5 at least two over-current protection modules stacked vertically and electrically connected in parallel, each of the over-current protection modules including:

(a) a positive temperature coefficient material layer;

(b) an upper electrode foil disposed on the upper surface of the
10 positive temperature coefficient material layer; and

(c) a lower electrode foil disposed on the lower surface of the positive temperature coefficient material layer;

a first metal terminal layer electrically connected to the upper electrode foils of the at least two over-current protection modules with at
15 least one non-full-circular conductive through hole and at least one full-circular conductive through hole;

a second metal terminal layer electrically connected to the lower electrode foils of the at least two over-current protection modules with at least one non-full-circular conductive through hole and at least one
20 full-circular conductive through hole; and

at least one first insulating layer for isolating the upper electrode foil of the uppermost over-current protection module from the second metal terminal layer, the lower electrode foil of the lowest over-current protection module from the first metal terminal layer and adjacent over-current
25 protection modules.

7. The over-current protection device according to Claim 6, further comprising a solder mask disposed between the first metal terminal layer

and the second metal terminal layer.

8. The over-current protection device according to Claim 6, wherein the full-circular conductive through hole is disposed on the surface of the first metal terminal layer and the second metal terminal layer.

5 9. The over-current protection device according to Claim 7, wherein the full-circular conductive through hole is disposed on the surface of the solder mask and electrically connects first metal terminal layer and the second metal terminal layer by a metallic wire.

10 10. The over-current protection device according to Claim 6, further comprising a second insulating layer disposed between the upper over-current protection module and the lower over-current protection module, wherein the second insulating layer is made of epoxy resin and glass fiber composite .

15 11. The over-current protection device according to Claim 6, wherein the non-full-circular conductive through hole is a half-circular conductive through hole or a quarter-circular conductive through hole.